Agenda Item: D1
Review of Spacecraft Current On-orbit Performance
NOAA-17, 16, 15, 14, 12, and 11

39th ARGOS O/C WP, NOAA

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M.Fitzmaurice

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NOAA-18,17, 16, 15, 14, and 12

EXECUTIVE SUMMARY

The current on-orbit operational satellite constellation maintained and operated by NOAA consists of the NOAA-18,17, 16, 15, 14, and 12 satellites. NOAA-18 was launched on May 20, 2005 and is undergoing On-orbit verification testing before replacing NOAA-16 (planned late summer 2005) as the operational 'afternoon' satellite. NOAA-17 was launched June 24, 2002 and is the current operational 'morning' (daylight equator crossing is around 1030 local). With the AMSU A1 instrument failing on NOAA-17 in October 2003, NOAA-15 has been re-tasked to provide the operational sounding data using its AMSU A1 instrument. This event was significant to the Argos community in that the data from NOAA-15 is being recovered in its entirety with an operational priority equivalent to NOAA-17 and NOAA-16. NOAA-16 was launched on September 21, 2000 and, as mentioned earlier, will be replaced operationally by NOAA-18 with regards to data recovery. The closeness of the NOAA-16's orbital plane (1441 LAN) and NOAA-18's orbital plane (1400 LAN) should not adversely affect the Argos community. The NOAA-14 satellite's orbital plane (currently 2039 LAN) continues to drift by almost 5 minutes per month and is being seriously considered for deactivation now that NOAA-18 has been launched. NOAA-14 is considered a backup satellite both operationally and in science data recovery. With 'backup' status, any conflicts with NOAA-18, NOAA-17, NOAA-16, or NOAA-15 data recovery efforts will be mitigated with NOAA-14 receiving the lowest priority (i.e., less timely data retrieval and resource allotment). NOAA-12 (1651 LAN) is currently in standby mode and transmitting APT and HRPT data real-time. With NOAA-12's status as a 'real-time' spacecraft, minimal 'dumping' of STIP (2-4 orbits per day) is scheduled once per day for health & safety. *NOTE: The NOAA-11 spacecraft was de-activated on June 16, 2004 and is no longer a NOAA asset.*

NO ACTION REQUIRED

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NOAA-18

The NOAA-18 satellite was successfully launched at 1022z from Vandenberg Air Force Base on Friday, May 20, 2005. The orbital insertion using the new Delta II launch vehicle was nearly flawless and predictions have the orbit plane staying within the 1330-1430 LAN 'window' for nearly six years. The satellite is currently undergoing its On-orbit verification testing and some performance issues are under investigation. These investigations include the HIRS longwave channels (outside noise specification), abnormal (but within specification) Pitch axis disturbances, and the DCS instrument's Data Recovery Unit #8. All other systems are performing nominally at this time. With its On-orbit verification testing and operational checkout, total data recovery is critical, but, timeliness of data recovery is not, until this satellite is deemed operational. In late summer 2005 (August/September), it is expected that NOAA-18 will replace NOAA-16 as the operational afternoon satellite. This declaration will occur after all performance reports have been delivered and NOAA's product processing centers have validated NOAA-18 data.

Note: The DCS instrument's Data Recovery Unit was turned off at the request of CNES on June 13, 2005.

NOAA-17

The NOAA-17 satellite successfully replaced NOAA-15 on March 20, 2003 as the primary operational morning descending satellite (albeit in a 2225 LAN orbital plane versus NOAA-15's 1806 LAN). Due to an on-orbit anomaly with the AMSU A1 instrument, the NOAA-15 satellite is being used to provide the missing morning orbit operational sounding data. This benefits the Argos community in that the Satellite Operations and Control Center (SOCC) in Suitland, Maryland currently retrieves all (24 hour) Data Collection System (DCS) instrument data via Global Area Coverage (GAC) playbacks during 10-12 real-time passes over their Fairbanks, Alaska and Wallops Island, Virginia Command and Data Acquisition (CDA) Stations each day. NOAA-17 also has had significant power drops in both its STX1 and STX3 transmitters. The drop in STX1 was enough that it is no longer used operationally while STX3 is still being used to transmit HRPT.

Note: The DCS instrument and all of its Data Recovery Units are fully operational with no anomalies reported. All DCS data is recovered at the highest operational priority as NOAA-17 is deemed a primary satellite.

NOAA-16

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The NOAA-16 satellite successfully launched at 3:22am PDT/6:22am EDT from Vandenberg Air Force Base on Thursday September 21, 2000 and began operating as the primary afternoon polar satellite on March 20, 2001, replacing NOAA-14. The current equator crossing time for NOAA-16 is 1441 LAN. The SOCC is currently retrieving all (24 hour) DCS instrument data via 10-12 real-time GAC playback opportunities each day. While it is currently the primary afternoon satellite, , data retrieval priority (timeliness) is higher and equivalent to N17. This priority will change once NOAA-18 is deemed operational. This event should not greatly impact the Argos community as the orbital coverage is nearly the same.

Note: The DCS instrument and all of its Data Recovery Units are fully operational and no anomalies reported.

NOAA-15

The NOAA-15 satellite was successfully launched on May 13, 1998 and began operating as the primary morning polar satellite on December 14, 1998. With the launch of N17 in June 2002, N15 became a secondary satellite in October 2002. The October 2003 failure of the AMSU A1 on-board NOAA-17 necessitated that the NOAA-15 AMSU A1 instrument provide the 'morning' sounding data. With the launch of NOAA-18, resource allocation necessitates that NOAA-15 can only be “seen” for nine passes per day. While all data is retrieved, timeliness of retrievals is affected. The current N15 equator crossing time is 0651 local. This orbital plane complements the NOAA-17 and NOAA-16 (soon to be 18) perfectly for the Argos data community.

Note: The DCS instrument and all of its Data Recovery Units are fully operational and no anomalies reported.

NOAA-14

NOAA-14 was successfully launched on December 30, 1994 and became operational on March 20, 2001. NOAA-14 and has been designated as standby afternoon satellite, but, due to orbit drift, its equator crossing time (2039 LAN) is that of a morning satellite. With this extensive drift to an early morning orbit, degradation to environmental products exists. NOAA-14 has drifted from its 1330 Local orbital insertion 6.5 years ago and continues to drift at an approximate rate of five (+5) minutes per month. Currently, the SOCC retrieves DCS data via stored TIP playbacks during 1-2 real-time satellite contacts per day. Due to resource allocations, NOAA-14 is the lowest priority spacecraft with regards to operations and data recovery. With this status, NOAA-14 is the most likely candidate for de-activation when the POES program makes that decision.

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Note: The DCS instrument and all of its Data Recovery Units are fully operational and no anomalies reported.

NOAA-12

NOAA-12 was launched on May 14, 1991 into an 825 km orbit. The current equator crossing time for this satellite is 1644 local descending node (launched into a 0732 descending orbit in 1991). While NOAA-12 is currently standby satellite, its unique orbital plane provides an extra plane of coverage, albeit, not full or planned coverage. NOAA-12 uses a 'recursive' stored command table and is only contacted once or twice per day for the downlink of up to four orbits of stored TIP (STIP). It should be noted that the data recovered is time-dependent on when SOCC "squeezes" a real-time contact and which recorders are ready for playback, not any specific coverage area. NOAA-12 is radiating real-time TIP (which the DCS data is contained in) on 136.77Mhz and HRPT on its STX1 (1698Mhz).

Note: The DCS system is fully operational.

NOAA-11

The NOAA-11 was de-activated on June 16, 2004.

Current status of all NOAA satellites (updated weekly) can be obtained at:

http://www.oso.noaa.gov

Summary

As can be readily ascertained, NOAA's current constellation of 6 satellites is providing extensive global coverage to the Argos community. The retrieval of DCS data is being accomplished on all 6 satellites using either GAC or STIP dataset recovery and real-time transmissions. Twenty-four hour GAC is being provided by 4 satellites in the early(15), mid-morning(17), and afternoon(16 &18) orbital planes while partial STIP recovery is being obtained from the other two satellites (12 &14). While noting that both NOAA-16 and NOAA-18 are providing nearly identical coverage areas it is believed that NOAA's current operational satellites are fully meeting the needs of the Argos user community.